

IPW

<b>TRANSMITTAL FORM</b> (to be used for all correspondence after initial filing)		Application Number	10/662,914
		Filing Date	September 15, 2003
		First Named Inventor	Lei et al.
		Group Art Unit	1652
		Examiner Name	Rebecca E. Prouty
Total Number of Pages in This Submission	6 pages and 45 references	Attorney Docket Number	19603/4261 (CRF D-2895A)

ENCLOSURES (check all that apply)		
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	Andrew K. Gonsalves Nixon Peabody LLP Clinton Square, P.O. Box 31051 Rochester, New York 14603-1051 Telephone: (585) 263-1658 Fax: (585) 263-1600
Signature	 Registration No. 48,145
Date	April 12, 2005

CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR 1.8(a)]	
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Date	4/12/2005
Signature	 Mary Burke
Typed or printed name	



PATENT  
Docket No.: 19603/4261 (CRF D-2895A)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s) : Lei et al.

Serial No. : 10/662,914

Cnfrm. No. : 2510

Filed : September 15, 2003

For : USING MUTATIONS TO IMPROVE  
ASPERGILLUS PHYTASES

)  
) Examiner:  
) Rebecca E. Prouty

) Art Unit:  
) 1652

INFORMATION DISCLOSURE STATEMENT  
UNDER 37 CFR §§ 1.97-1.98

**Mail Stop: Amendment**  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

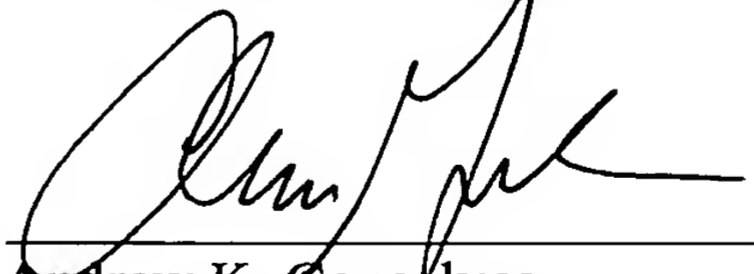
Pursuant to 37 CFR §§ 1.97-1.98, applicants hereby bring to the attention of the United States Patent and Trademark Office, the enclosed references listed on the attached PTO-1449 form.

Pursuant to 37 CFR § 1.98(a)(2)(ii), copies of the cited U.S. patent application publications (i.e., Reference Cite Nos. 1-5) and U.S. patents (i.e., Reference Cite Nos. 6-15) are not enclosed.

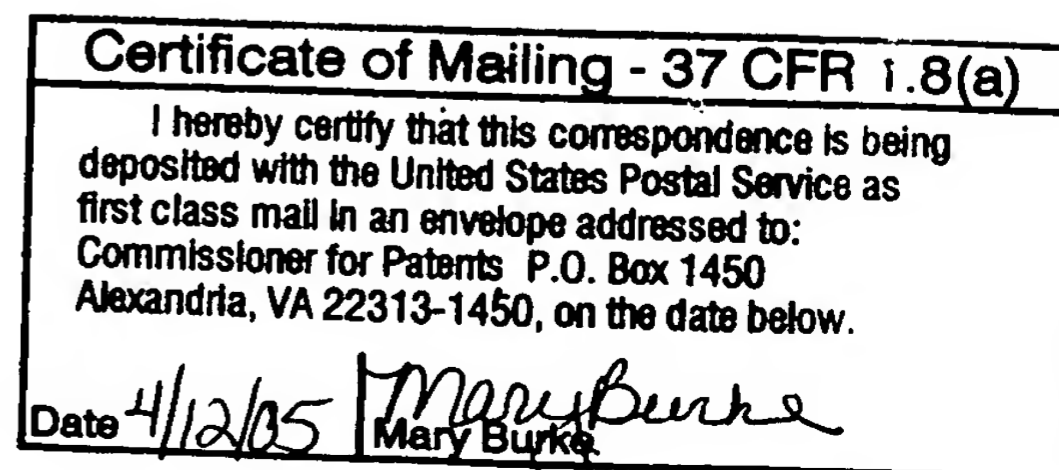
Pursuant to 37 CFR § 1.97(b)(3), no fee is required. Should it be determined that a fee is required, the Commissioner is authorized to charge any additional fee to Deposit Account No. 14-1138.

Respectfully submitted,

Date: April 12, 2005

  
Andrew K. Gonsalves  
Registration No. 48,145

NIXON PEABODY LLP  
Clinton Square, P.O. Box 31051  
Rochester, New York 14603-1051  
Telephone: (585) 263-1658  
Facsimile: (585) 263-1600





Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

**Complete if Known**

Application Number	10/662,914
Filing Date	September 15, 2003
First Named Inventor	Lei et al.
Art Unit	1652
Examiner Name	Rebecca E. Prouty
Attorney Docket Number	19603/4261 (CRF D-2895A)

Sheet 1 of 4

**U.S. PATENT DOCUMENTS**

Examiner Initials <sup>2</sup>	Cite No. <sup>1</sup>	U.S. Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number - Kind Code <sup>3</sup> (if known)			
	1	US-2002/0068350 A1	06/06/2002	Kondo et al.	
	2	US-2002/0102692 A1	08/01/2002	Lei	
	3	US-2002/0127218 A1	09/12/2002	Svendsen et al.	
	4	US-2002/0136754 A1	09/26/2002	Short et al.	
	5	US-2003/0092155 A1	05/15/2003	Kostrewa et al.	
	6	US-5,436,156	07/25/1995	Van Gorcom et al.	
	7	US-5,443,979	08/22/1995	Vanderbeke et al.	
	8	US-5,593,963	01/14/1997	Van Ooijen et al.	
	9	US-5,780,292	07/14/1998	Nevalainen et al.	
	10	US-5,834,286	11/10/1998	Nevalainen et al.	
	11	US-5,863,533	01/26/1999	Van Gorcom et al.	
	12	US-6,309,870	10/30/2001	Kondo et al.	
	13	US-6,350,602	02/26/2002	Van Gorcom et al.	
	14	US-6,391,605	05/21/2002	Kostrewa et al.	
	15	US-6,514,495	02/04/2003	Svendsen et al.	
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**FOREIGN PATENT DOCUMENTS**

Examiner Initials <sup>2</sup>	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup> Number <sup>4</sup> Kind Code <sup>5</sup> (if known)				
	16	EP 0 420 358 B1	05/12/1999	Van Gorcom et al.		
	17	EP 0 684 313 A2	11/29/1995	Van Loon et al.		
	18	JP 10-276789	10/20/1998	Kosutoriwa et al.		X
	19	JP 2001-292789	10/23/2001	Van Loon et al.		X
	20	RU 2 113 468 C1	06/20/1998	Van Gorcom et al.		X
	21	WO 00/43503	07/27/2000	Lehmann		
	22	WO 86/01179	02/27/1986	Conti		
	23	WO 91/05053	04/18/1991	Van Gorcom et al.		
	24	WO 99/49022	09/30/1999	Svendsen		

Examiner Signature		Date Considered	
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at 222.uspto.gov or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

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Substitute for form 1449B/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(use as many sheets as necessary)</i>				<b>Complete if Known</b>	
				Application Number	10/662,914
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				Group Art Unit	1652
				Examiner Name	Rebecca E. Prouty
Sheet	2	of	4	Attorney Docket Number	19603/4261 (CRF D-2895A)

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	25	GenBank Accession No. AAB96872 (January 16, 1998)	
	26	GenBank Accession No. M94550 (April 27, 1993)	
	27	GenBank Accession No. P34752 (January 25, 2005)	
	28	Han et al., "Expression of an <i>Aspergillus niger</i> Phytase Gene ( <i>phyA</i> ) in <i>Saccharomyces cerevisiae</i> ," <i>Appl. Environ. Microbiol.</i> 65(5):1915-1918 (1999)	
	29	Han et al., "Role of Glycosylation in the Functional Expression of an <i>Aspergillus niger</i> Phytase ( <i>phyA</i> ) in <i>Pichia pastoris</i> ," <i>Arch. Biochem. Biophys.</i> 364:83-90 (1999)	
	30	Kostrewa et al., "Crystal Structure of <i>Aspergillus niger</i> pH 2.5 Acid Phosphatase at 2.4 Å Resolution," <i>J. Mol. Biol.</i> 288:965-974 (1999)	
	31	Kostrewa et al., "Crystal Structure of Phytase from <i>Aspergillus ficuum</i> at 2.5 Å Resolution," <i>Nat. Struct. Biol.</i> 4:185-190 (1997)	
	32	Lehmann et al., "Exchanging the Active Site Between Phytases for Altering the Functional Properties of the Enzyme," <i>Protein Sci.</i> 9(10):1866-1872 (2000)	
	33	Lehmann et al., "From DNA Sequence to Improved Functionality: Using Protein Sequence Comparisons to Rapidly Design a Thermostable Consensus Phytase," <i>Protein Eng.</i> 13(1):49-57 (2000)	
	34	Lei et al., "Calcium Level Affects the Efficacy of Supplemental Microbial Phytase in Corn-Soybean Meal Diets of Weanling Pigs," <i>J. Anim. Sci.</i> 72(1):139-143 (1994)	
	35	Lei et al., "Nutritional Benefits of Phytase and Dietary Determinants of its Efficacy," <i>J. Appl. Anim. Res.</i> 17:97-112 (2000)	
	36	Lei et al., "Supplemental Microbial Phytase Improves Bioavailability of Dietary Zinc to Weanling Pigs," <i>J. Nutr.</i> 123:1117-1123 (1993)	
	37	Lei et al., "Supplementing Corn-Soybean Meal Diets with Microbial Phytase Linearly Improves Phytate Phosphorus Utilization by Weanling Pigs," <i>J. Anim. Sci.</i> 71:3359-3367 (1993)	

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	38	Mitchell et al., "The Phytase Subfamily of Histidine Acid Phosphatases: Isolation of Genes for Two Novel Phytases from the Fungi <i>Aspergillus terreus</i> and <i>Myceliophthora thermophila</i> ," <i>Microbiology</i> 143:245-252 (1997)		
	39	Mullaney et al., "Advances in Phytase Research," <i>Advances in Applied Microbiology</i> 47:157-199 (2000)		
	40	Mullaney et al., "Phytase Activity in <i>Aspergillus fumigatus</i> Isolates," <i>Biochem. Biophys. Res. Commun.</i> 275:759-763 (2000)		
	41	Mullaney et al., "Positive Identification of a Lambda gt11 Clone Containing a Region of Fungal Phytase Gene by Immunoprobe and Sequence Verification," <i>Appl. Microbiol. Biotechnol.</i> 35:611-614 (1991)		
	42	Mullaney et al., "Site-Directed Mutagenesis of <i>Aspergillus niger</i> NRRL 3135 Phytase at Residue 300 to Enhance Catalysis at pH 4.0," <i>Biochem. Biophys. Res. Commun.</i> 297(4):1016-1020 (2002)		
	43	Nielsen et al., "The Determinants of $\alpha$ -Amylase pH-Activity Profiles," <i>Protein Eng.</i> 14(7):505-512 (2001)		
	44	Ostanin et al., "Asp <sup>304</sup> of <i>Escherichia coli</i> Acid Phosphatase is Involved in Leaving Group Protonation," <i>J. Biol. Chem.</i> 268(28):20778-20784 (1993)		
	45	Ostanin et al., "Overexpression, Site-Directed Mutagenesis, and Mechanism of <i>Escherichia coli</i> Acid Phosphatase," <i>J. Biol. Chem.</i> 267(32):22830-22836 (1992)		
	46	Pasamontes et al., "Gene Cloning, Purification, and Characterization of a Heat-Stable Phytase from the Fungus <i>Aspergillus fumigatus</i> ," <i>Appl. Environ. Microbiol.</i> 63(5):1696-1700 (1997)		
	47	Rodriguez et al., "Expression of the <i>Aspergillus fumigatus</i> Phytase Gene in <i>Pichia pastoris</i> and Characterization of the Recombinant Enzyme," <i>Biochem. Biophys. Res. Commun.</i> 268:373-378 (2000)		
	48	Rodriguez et al., "Site-Directed Mutagenesis Improves Catalytic Efficiency and Thermostability of <i>Escherichia coli</i> pH 2.5 Acid Phosphatase/Phytase Expressed in <i>Pichia pastoris</i> ," <i>Arch. Biochem. Biophys.</i> 382:105-112 (2000)		

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	49	Tomschy et al., "Active Site Residue 297 of <i>Aspergillus niger</i> Phytase Critically Affects the Catalytic Properties," <i>FEBS Lett.</i> 472(2-3):169-172 (2000)	
	50	Tomschy et al., "Engineering of Phytase for Improved Activity at Low pH," <i>Appl. Environ. Microbiol.</i> 68(4):1907-1913 (2002)	
	51	Tomschy et al., "Optimization of the Catalytic Properties of <i>Aspergillus fumigatus</i> Phytase Based on the Three-Dimensional Structure," <i>Protein Sci.</i> 9(7):1304-1311 (2000)	
	52	Ullah et al., "Cyclohexanedione Modification of Arginine at the Active Site of <i>Aspergillus ficuum</i> Phytase," <i>Biochem. Biophys. Res. Commun.</i> 178(1):45-53 (1991)	
	53	Ullah et al., "Extracellular Phytase (E.C. 3.1.3.8) from <i>Aspergillus ficuum</i> NRRL 3135: Purification and Characterization," <i>Prep. Biochem.</i> 17(1):63-91 (1987)	
	54	van Dijck, P.W.M., "Chymosin and Phytase. Made by Genetic Engineering (No. 10 in a Series of Articles to Promote a Better Understanding of the Use of Genetic Engineering)," <i>J. Biotechnology</i> 67:77-80 (1999)	
	55	Van Etten et al., "Covalent Structure, Disulfide Bonding, and Identification of Reactive Surface and Active Site Residues of Human Prostatic Acid Phosphatase," <i>J. Biol. Chem.</i> 266(4):2313-2319 (1991)	
	56	van Hartingsveldt et al., "Cloning, Characterization and Overexpression of the Phytase-Encoding Gene ( <i>phyA</i> ) of <i>Aspergillus niger</i> ," <i>Gene</i> 127:87-94 (1993)	
	57	Wodzinski et al., "Phytase," <i>Adv. Appl. Microbiol.</i> 42:263-302 (1996)	
	58	Wyss et al., "Biochemical Characterization of Fungal Phytases ( <i>myo</i> -Inositol Hexakisphosphate Phosphohydrolases): Catalytic Properties," <i>Appl. Environ. Microbiol.</i> 65(2):367-373 (1999)	
	59	Wyss et al., "Biophysical Characterization of Fungal Phytases ( <i>myo</i> -Inositol Hexakisphosphate Phosphohydrolases): Molecular Size, Glycosylation Pattern, and Engineering of Proteolytic Resistance," <i>Appl. Environ. Microbiol.</i> 65(2):359-366 (1999)	
	60	Yi et al., "Sites of Phytase Activity in the Gastrointestinal Tract of Young Pigs," <i>Animal Feed Science Technology</i> 61:361-368 (1996)	

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